Citizens' Bulletin

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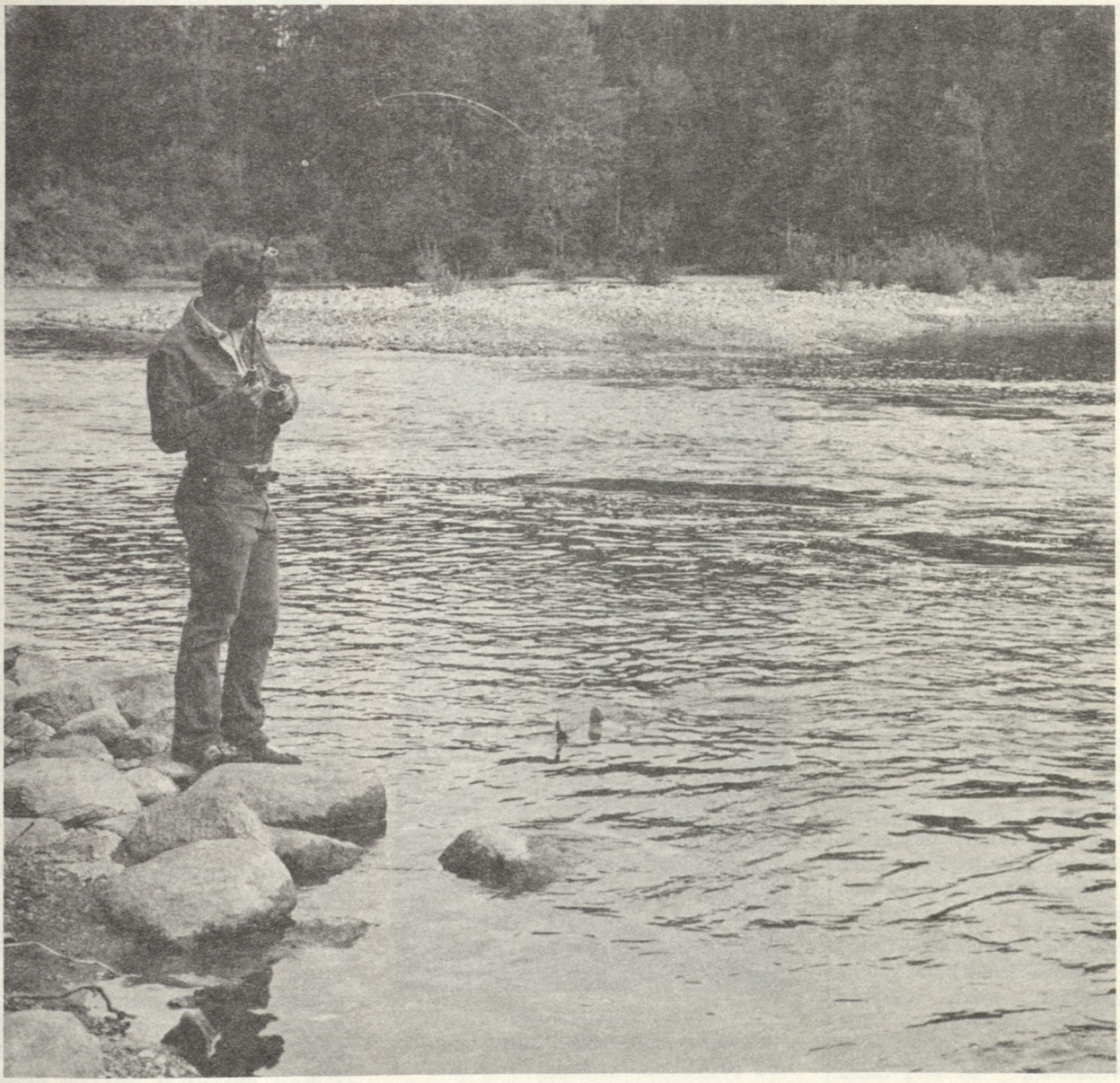
The Connecticut Department of Environmental Protection

It's that time of year again



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Cover Photo: Fishermen brings in trout. (Leonard Lee Rue III)

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Data Base tracks state's rare species

Connecticut's landscape is quickly becoming one of tall buildings and spreading blacktop in place of tall trees with spreading boughs. Critical habitat destruction, coupled with a decline in the number of plant and animal species, is an ever-increasing problem in the state.

It has become apparent that in order to cope with this problem, Connecticut needs a system to identify and inventory its natural resources. In a cooperative effort between the Connecticut Geological and Natural History Survey, The Nature Conservancy and National Audubon Society, the Connecticut Natural Diversity Data Base was formed to meet this need.

Les Merhoff

The yellow-fringed orchid is one of the species which will be protected through the use of the Natural Diversity Data Base.

The Connecticut Natural Diversity Data Base has mapped current and historic locations of rare and endangered species in the state on USGS topographic maps. Geometric symbols of several colors are used to code information on the maps. New localities are continually being added and old localities updated by field investigations and a little detective work.

In addition to the locations, the Data Base stores information regarding the population size and dynamics of rare species. Ownership, management needs, and threats facing the population are included when available. Thanks to a Hewlett-Packard computer, these data are organized, kept track of, and made readily accessible.

Like most things in this life, the Natural Diversity Data Base is a two-way street. It is not enough to merely pull all this information together. The information must be available to planners, developers and decision-makers so conservation of these critical resources can be considered early in the planning process.

Information is willingly supplied upon request. Requests must be made in writing and accompanied by a topographic map with the area in question clearly outlined. Normally, requests are processed in one week.

In addition to habitat destruction, many rare and endangered species are threatened with collection by unscrupulous individuals. The species'

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Treat your catch with TLC*

*Tender Loving Care

By Frank Glista, Boating Safety Representative,
Information & Education Unit

You've caught a mess of fish, and there's a lot of good eating awaiting if you properly care for your catch.

Fish and seafood are at their absolute best when first lifted from the water. From that moment, it's all downhill. But your catch can lose its quality rapidly or slowly ....that part is up to you. How fast it loses quality is directly related to: 1) how you clean it; 2) how cold it is kept; and 3) how long you keep it.

Truly fresh fish is almost odorless. Fish begin to smell "fishy" when deterioration sets in, caused by incorrect handling and storage practices that bring about a release of oxidized fats and acids through bacterial and enzymatic action.

Fresh fish eyes are bright and clear. The flesh is firm. (An easy test to determine the freshness of a large fish is to press a finger against the fish. If the dimple caused by the finger does not return to normal the fish has already lost quality and flavor.)

By following the few rules listed you can assure yourself a fine product and delicious eating:

1. Fish should be killed and iced down in crushed ice. Keeping fish in a bag dangling overboard in Long Island Sound, where the temperature approaches 70 degrees, will not retard spoilage, though it is better than exposure on dock or beach.

2. At the earliest possible opportunity, gut and wash fish in cold fresh water. A simple washing does more to remove spoilage bacteria than any other thing you can do. Knives, cutting board, and work area must be clean, as bacteria can multiply at an alarming rate. Bleach and water is an excellent sanitizing solution. Let equipment stand five to 10 minutes and then rinse off with fresh water. Air dry to avoid contamination, or at least use clean wiping cloths.

3. If fish is to be used fresh it should be packed in crushed ice even if kept in the refrigerator. The temperature should not be allowed to go over 35 degrees while in storage.

4. Excess fish can be frozen and retained for future use. Fillet or cut into steaks or useable portions, rinse, dry off, and wrap in a plastic wrapper or bag and remove all air pockets. Then wrap in freezer paper. Identify and date packages. Flash freeze if your freezer has such a unit, otherwise freeze as quickly as possible by placing in coldest part of freezer. Ideal storage temperature should be -15 degrees F. but storage at 0 degrees is acceptable. When using any frozen product always remember, "First in -- First out."

Fish may also be preserved for later use by several processes, such as salting, drying, smoking and pickling. These processes were used for centuries before refrigeration and swift distribution were possible.

Smoked or pickled fish make delicious appetizers or snacks. A couple of recipes are listed below. Many variations are possible depending on individual taste.

Pickled Fish

Mix: one cup pickling salt and one quart water. Cover the fish with this mixture and let stand 24 hours. Stir occasionally. Pour off liquid. Cover with white vinegar and let soak 24 hours. Pour off this liquid.

Mix: two cups white vinegar, one cup water, 3/4 cup sugar, and two to three tablespoons pickling spices. Boil 10 to 15 minutes. Cool. Add one cup white port wine, peel and slice one lemon and one onion. Pour over fish. Leave 12 hours. The fish is ready to eat. (Courtesy of the "National Fisherman").

Fish Smoking

Smoked fish are delicious. Smoking is one of the oldest known methods of preserving

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The Canada goose in Connecticut

Wildlife Bureau Informational Series

General

The Canada goose is one of the most conspicuous of Connecticut's birds. It is easily recognized by its black head, bill, and neck that contrast strikingly with its pale gray breast. A distinct white cheek patch that covers the throat is a characteristic field mark. The birds are gray brown to dark brown on the back and wings, white on the belly and have black rump and tail feathers that are separated from each other by a narrow but distinct band of white feathers.

Flocks of geese travel in long strings flying in "V" formations, and their raucous honking can be heard for miles. There are many different subspecies or races of Canada geese which vary greatly in size; however, most birds in Connecticut weigh from six to 13 pounds.

Range and Habitat in Connecticut

Canada geese occur statewide. During the spring and summer breeding season they can be found in traditional nesting areas such as marshes and isolated lakes and rivers, as well as in less desirable locations such as golf courses, park ponds, and reservoirs. In fall and winter geese are also found throughout the state until inland freshwater areas freeze; then the birds concentrate in the coastal region. Throughout the year the highest numbers of geese are found in Fairfield County. Since Connecticut winter waterfowl surveys began in the 1940's, Canada goose numbers have steadily increased. In the 1950's the average mid-winter count was 138, in the 1960's it was 358, and in the 1970's it was up to 2,543. In 1984, 6,600 birds were recorded. This phenomenal increase is apparently due to the species' adaptation to man's landscaping practices. Canada geese seem to be moving into every area of the state with the right combination of water, cover, and grazing areas. The increase in this type of habitat, with hundreds of new ponds and lakeside lawns since the 1950's, seems to be proportionate to the increased numbers of geese. It should be noted that year-round resident geese breeding in the state are distinct from migratory populations that nest in the Arctic. Many breeding birds in the state are probably descendants of live decoy goose flocks released in the 1930's when the use of live decoys was outlawed, or of releases by private individuals or groups.

Habits

In the spring the Canada goose is one of our earliest nesters. They may begin defending nest territories in March and nesting in early April. Yearlings generally do not attempt to nest, while about one-third of the two-year-olds do nest, as do most three-year-olds. Canada geese are monogamous and pairs mate for life. They utilize a great variety of nest structures such as islands, man-made structures, muskrat and beaver lodges, and shoreline edges. Regardless of the location, nest site requirements include proximity to water, cover for the nest, and an exposed view for the incubating bird. Usually four to seven eggs are laid which the female incubates while the male stands guard a short distance away. Incubation lasts about 25 to 30 days. Survival of nests and goslings is generally high. Nest losses are caused by flooding, desertion, and predation. Predators at this stage include skunks, foxes, dogs, and herring gulls. Newborn geese may be preyed upon by snapping turtles and gulls.

Benefits

The resonant calls from flocks of migrating geese have long been a welcome harbinger of autumn to outdoor enthusiasts. Observing the Canada goose is undoubtedly a source of enjoyment for many state residents. Hunters also enjoy the challenge of bagging a bird as wary as the Canada goose.

Management of Nuisances

Unfortunately, the challenge of the Canada goose to many state residents today is keeping nuisance birds off their lawns, ponds, golf courses, and even swimming pools. In Connecticut, complaints of nuisance geese are on the rise. They foul reservoirs, golf courses, parks, and lawns with their molted feathers and droppings and can cause algae blooms by overfertilization of ponds. They also can damage cranberry bogs, winter cover crops and pasture areas. In the summer the odor caused by droppings and the noise may annoy some people.

A flock of geese may also create a health hazard to themselves and migrant waterfowl due to crowding and unsanitary conditions associated with high concentrations of geese. Resident geese sometimes serve as decoys attracting migrant waterfowl. This can lead to crowded conditions and encourage the spread of diseases through the wild population. Further complicating the situation in Connecticut is the feeding of geese by the public. Geese feeding on nutritionally deficient foods, such as bread, may be more susceptible to disease outbreaks.

There are no easy solutions to nuisance goose problems. Where hunting is feasible, it is a viable management tool that can reduce nuisance problems as well as provide recreation to sportsmen and practical utilization of a surplus wildlife resource. Unfortunately, many nuisance goose problems are in urban and suburban areas where hunting is not feasible.

In some cases, geese can be rounded up during the molting period in July when they are flightless and transferred to other areas. The Wildlife Bureau has cooperated with the U.S. Fish and Wildlife Service for many years in trapping and transferring nuisance geese. This is a partial solution but experience has shown that it is not solving the problem. A variety of "scare" tactics have been developed for controlling the depredation of agricultural crops. Many of these methods are also applicable on golf courses, lawns, and other areas. Such techniques include using scarecrows, dogs, lights, balloons, automatic exploding shells and various other devices.

Scarecrows -- Scarecrows are a traditional method of controlling bird damage to crops, gardens, and lawns. They are most effective if used in large numbers, at least one for every 10 to 15 acres. A portion of the scarecrow must move in the wind because moving objects frighten geese more than stationary objects. Also it is an absolute necessity to move scarecrows every two or three days so that the geese do not become used to them.

Dogs -- Some landowners have used dogs to effectively keep geese out of an area. A free-ranging dog trained to chase birds as soon as they land is quite effective.

Lights -- Aircraft and other emergency-type strobe lights have been used with limited success. Flashing should be

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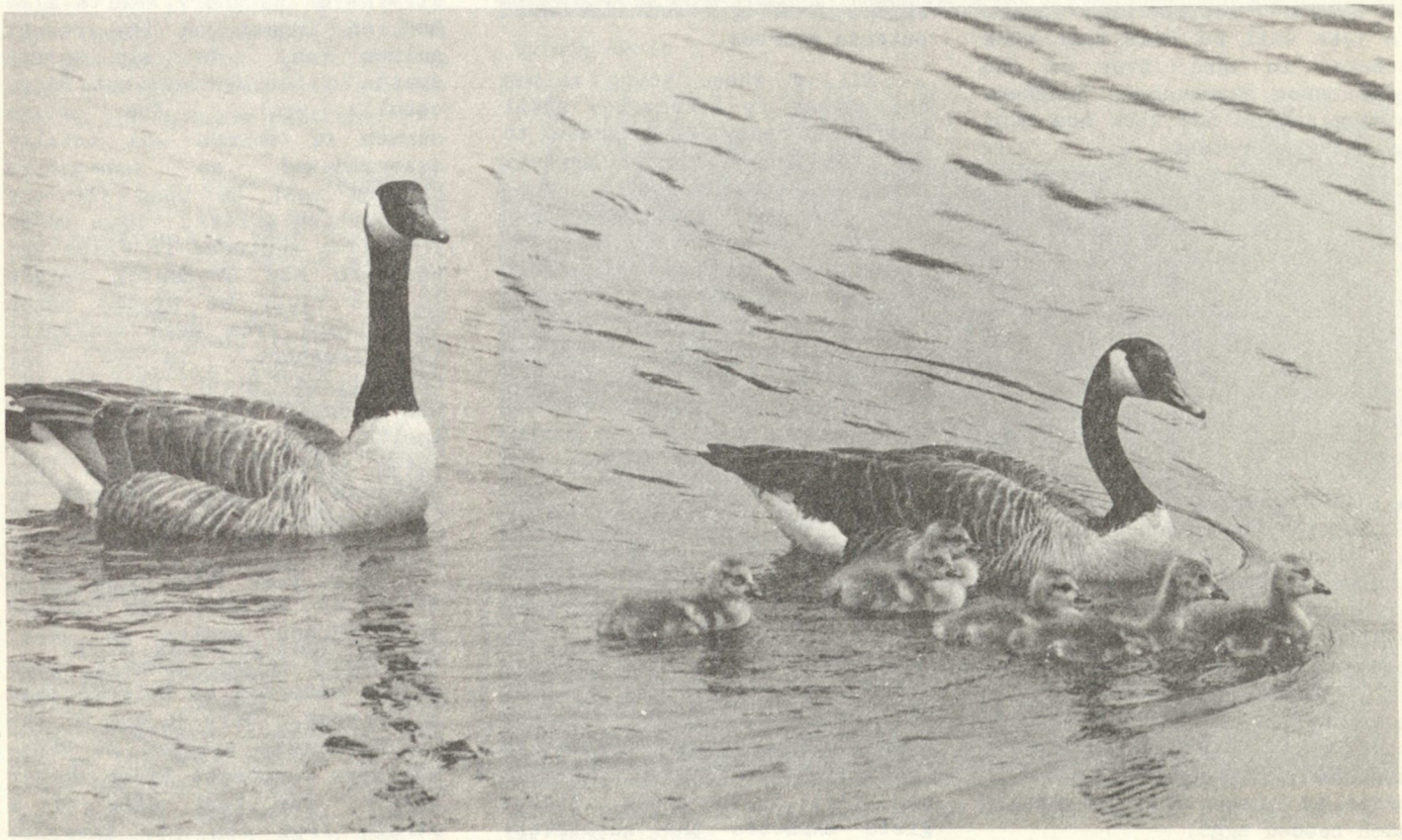


Canada geese and young; Leonard Lee Rue III

Where did they go?

1983's low salmon return rate has biologists guessing

By Steve Gephard, Fisheries Biologist, Bureau of Fisheries

Biologists with the Atlantic Salmon Restoration Program, which began in 1966, are now preparing for the 1984 season, during which they will stock hundreds of thousands of young salmon into the Connecticut River Basin and capture adult salmon returning to the basin to spawn. Adults that return in 1984 will be fish that were stocked in 1982. Even as the new season approaches, however, biologists do not know how many salmon will return.

In 1983, 39 salmon were known to have returned to the Connecticut River, the lowest number since 1977 when seven fish were captured. (Seventy salmon returned in 1982.) Fourteen were captured at the DEP-operated Rainbow fishway on the tributary Farmington River and 25 were captured at the Holyoke dam fishlift on the mainstem Connecticut River in Massachusetts. None were taken at the DEP-operated Leesville fishway on the Salmon River. Although there were rumors that anglers caught a few other salmon (angling for salmon is legal), these reports were never confirmed. Biologists attempt to capture as many of the returning adults as possible in order to spawn them and obtain much-needed eggs.

Since there is currently no natural reproduction of salmon in the basin, all returning fish are the product of hatchery stockings. Some of the fish that are stocked are offspring from adults that have previously returned to the river basin. The rest are raised from eggs obtained from outside sources.

All of these young salmon are raised in hatcheries until they are ready to migrate to the sea in order to protect them and maximize their numbers. At the time when they are ready to go to sea they are referred to as "smolts" and are usually one year old. Since the vast majority of all Connecticut River salmon spend two years at sea, the number of returning adults depends on the number of hatchery smolts stocked into the river two years earlier.

In 1980 and 1981, biologists were unable to stock very many smolts into the river because a disease epidemic in a federal hatchery during the late 1970s killed most of the fish committed for Connecticut River stocking. This severely reduced the number of smolts which could be stocked in 1980 and 1981. Therefore, biologists expected the relatively low adult returns in 1982 and 1983. Those returns were totally independent of the record return of 529 salmon in 1981 and the high returns that might occur over the next few years.

Different quality of strains of hatchery smolts also had an impact on the recent salmon run. Not all salmon adapt to the Connecticut River equally well. The native strain of salmon was totally exterminated so non-native strains must be used for the restoration effort. Eggs taken from fish captured in Maine and southern New Brunswick return to the river at higher rates than those from eggs originating elsewhere. In 1981, the Connecticut River at Holyoke was stocked with about 16,000 smolts, all of the Penobscot River strain, the strain that provides the best returns to the Connecticut River.

That year the Farmington River at Rainbow was stocked with 55,000 smolts as well. Two years later, however, more adults returned to Holyoke than to Rainbow. Only 10,000 of the 55,000 smolts stocked at Rainbow were Penobscot River strain fish. The rest were of a strain from the St. Lawrence

region in Quebec which has never shown good return rates to the Connecticut River. All of the smolts stocked into the Salmon River were of this strain, and the total lack of returns to that river as well as the relatively few returns to the Farmington imply that the St. Lawrence smolts produced no adult returns. The 1983 adults were probably all of the Penobscot River strain.

Biologists expected low returns in 1983 due to the quantity and quality of the 1981 smolts. They did not, however, expect the returns to be as low as they were. Something else had to have been a factor in the scarcity of adult salmon. Indeed, nearly every Atlantic salmon river in the world experienced disastrously low runs. Some New Brunswick rivers were reported to have received one-thirtieth of the number of salmon they usually receive. It became apparent to biologists that there was a problem with the stocks of salmon out at sea. Therefore, the low return to the Connecticut River was probably caused by a combination of a poor smolt stocking (in terms of quantity and quality) in 1981 and poor survival at sea due to yet unknown factors.

There is general agreement among biologists and salmon conservationists that too many salmon are being netted at sea. Also, the method of netting is indiscriminate since salmon from nearly every river in the North Atlantic region intermingle on the fishing grounds. Fish from rivers with only a few salmon (such as the Connecticut River) are netted right along with fish from rivers where salmon are relatively abundant (such as Quebec's Moise River).

While modifications in the high-seas fisheries are certainly needed, those over-exploitive fisheries may not be the sole reason for the stock decline in 1983. Complex and subtle ecological influences may also have played a role in the decline. A similar decline occurred in 1979 and biologists later attributed it to a collapse of the stocks of capelin, a smelt-like fish that salmon prey upon while at sea. Canadian biologists report the capelin were very numerous in 1983 but the species congregated much further south than normal.

This abnormal behavior may have been due to unusually cold water temperatures during 1982 and 1983 in the Davis Straits off Greenland, where the capelin (and salmon) feed. Many biologists feel that the cold temperatures pushed the capelin south and made them unavailable to the salmon. At least one Canadian biologist theorizes that the cold oceanic temperatures are related to the "El Nino" phenomenon, an aberrant warm-water current in the equatorial Pacific Ocean that triggered global climatic shifts. Considering the unusual weather patterns all over the world during 1983, this explanation seems plausible.

Based solely on the 1982 smolt stockings, the outlook for the 1984 Connecticut River salmon run is excellent. A re-

Salmon smolt

Steve Fish photos

Steve Gephard, Fisheries Biologist, by the imprint pond at the Rainbow Fishway.

cord number of smolts were stocked in 1982 so a record number of adults should be expected back in 1984. However, there are indications that the mysterious problems at sea that affected the 1983 runs may continue through 1984. The hint of another poor year came in October when the annual high-seas fishery off Greenland achieved about one-fifth of its quota. The fish that this fishery nets in August through October are part of the group that will return to rivers the following spring. The low 1983 catch rate has many biologists worried that there may be few fish out there, resulting in another poor year for salmon runs in rivers. Others suggest that perhaps the salmon relocated in order to chase the capelin, and therefore were unavailable to the fishery. The bottom line is that we have no idea what really will happen in 1984. The salmon run might range anywhere from very large to very small.

Although only 14 salmon were captured in Connecticut during 1983, biologists were encouraged by the fact that all but one of the fish survived until spawning time in the fall. Mortalities are normally expected between the time the fish are captured in the spring and the time they are spawned in the fall. However, attempts have been made in recent years to reduce the mortality by improving techniques and reducing stress to the fish. Due to the hard work of the staff at the Peoples State Forest Salmon Station in Barkhamsted, the 1983 survival rate was a record high of 92.8 percent. The only salmon that did not survive until spawning was deliberately killed in a successful effort to eliminate a contamination of the Salmon Station by a bacterial pathogen.

The contamination of the Salmon Station by bacterial kidney disease (BKD) made the news last spring but was a relatively minor incident. Several salmon that were captured and spawned in 1982 died of mysterious causes in early 1983 while they were still in the Barkhamsted facility. The cause of death was finally diagnosed as BKD in early May, after the first 1983 salmon had been captured at the Rainbow Fishway and taken to the Salmon Station. BKD is an uncommon disease in southern New England and is very lethal to anadromous fishes such as salmon. In order to eradicate the pathogen before more 1983 salmon arrived, the staff was instructed to thoroughly sterilize the facility, which meant disinfecting the tanks, pipes, walls, ceiling...even pencils, tools, and nails. It also meant that all fish on station had to be destroyed since they might be harboring the bacterium. While most of the sacrificed fish were spawned-out 1982 salmon (called "kelts"), the first 1983 salmon was also destroyed. The sterilization process was a success since BKD was never again found and all incoming fish remained healthy throughout the season.

One major reason that adult salmon returning from the ocean are not held at hatcheries is the likelihood of such contaminations. Once a fish has been released "into the wild," it may pick up various pathogens, often at sub-lethal levels. If such contaminated fish were held in a hatchery, these diseases might kill thousands of young salmon being reared for future stockings.

Because of space limitations, some of the salmon caught at Holyoke had to be held in hatcheries for the last few years. In 1983, however, the U.S. Fish and Wildlife Service completed a new salmon station in Sunderland, MA. Similar in design and purpose to our Peoples State Forest facility, Sunderland will hold all of the salmon captured at the Holyoke fishlift. It has a capacity of over 400 adult fish.

While it is difficult to view 1983 as a successful year, the events of the season do not point to program failure but rather demonstrate how much of the Atlantic salmon's life cycle is beyond our control. Every year biologists in Connecticut and the other New England states become more skilled at managing the salmon within their political boundaries, but once the highly-migratory species leaves the region, the fish are at the mercy of random environmental influences and other political entities. In 1983, a record number of over 260,000 smolts were released into the Connecticut River watershed, including 62,000 smolts in the Farmington River and 33,000 in the Salmon River. If all goes well, these stockings should produce a large adult return in 1985.

In 1983, Atlantic salmon-producing nations on both sides of the ocean signed a treaty that created the North Atlantic Salmon Convention Organization, which has representatives from each nation, including three from the U.S. It will be NASCO's responsibility to try to eliminate problems in the high seas and institute sound salmon management on an international basis. If it succeeds at that task, the pace of the Connecticut River Atlantic Salmon Restoration Program will surely accelerate. ■

We want to know

How do you feel about a recreational salmon fishery?

Bureau of Fisheries

With the prospects improving for a restored Atlantic salmon fishery, a system must be developed for the management of that fishery. The purpose of the system is to provide acceptable fishing while protecting the resource from depletion. The stated goal of the Connecticut River Atlantic salmon restoration program is "to provide and maintain a sport fishery for Atlantic salmon in the Connecticut River Basin and to restore and maintain a spawning population in selected tributaries."

The goal and objectives for Connecticut's salmon program will be finalized after public discussion. The following, however, is offered as a preliminary statement:

Goal

To provide for the recreational harvest of Atlantic salmon at a level commensurate with the requirements of the interstate cooperative restoration program and with due consideration for traditional fisheries.

Objectives

1) Provide the opportunity for an angler to fish for Atlantic salmon when harvestable surpluses are available.

2) Maintain an adequate broodstock population for artificial and/or natural reproduction.

3) Minimize the impacts of a new Atlantic salmon fishery on existing fisheries and mitigate the conflicts which may arise between different segments of the fishing public.

4) Continue support for the interstate cooperative restoration program within the public and private sectors.

5) Maintain a strong public education program.

6) Support an adequate law enforcement program to assure compliance with management regulations.

To achieve these objectives, and ultimately this goal, will require careful planning for the management of the successfully restored resource in addition to the continuation of the present restoration efforts. In essence, we are faced with the need to provide fishing opportunities but to so regulate them that they are not self destructive. Several categories of management measures must be considered. These include: entry restrictions, size limitations, area closures, season closures, catch limitations, and gear restrictions. Some combination incorporating all of these categories will probably be necessary.

Entry Restrictions

Four approaches to the regulation of entry to the fishery are recognized. Ranging from the least to the most restrictive, they may be identified as: laissez faire or open fishery; limited access; limited entry; and limited access and limited entry.

The laissez faire or open fishery may be the simplest ap-

proach to implement but, because of the extent of the potential interest in the fishery, could be impractical. The social impacts and effects on traditional fisheries could be tremendous.

The limited access approach may involve limiting fishing to specific places, specific times or both and may also include a special license, tag and/or stamp but would be open to all interested participants.

If anticipated participation is greater than the available space would handle, the limited entry approach may be necessary. This would involve determining the number of participants that is appropriate and developing a method to limit entry to the fishery to that number of anglers. This could involve the use of a special license or stamp allocated on a pre-established random system. If the total acceptable harvest is determined, as well as the appropriate number of participants, a system using non-reusable tags could be utilized.

If both space and time must be controlled, a combination limited access/limited entry approach might be needed. This would involve issuing a limited number of special licenses or stamps, each of which is valid only at one or more specific sites.

Size Limitations

Size limits may be used to protect a population segment of a specific species and/or to minimize the catch of one species that can easily be misidentified as another. To be effective, size limits for salmon must be combined with compromise size limits for other species such as trout, in order to prevent catches of salmon smolts mistaken for trout.

Area Closures

Areas may be closed for one or more of the following purposes: to limit total catch; to protect spawning adults; to protect migrating fish; and to protect young fish in nursery areas. Another type of closure, perhaps more appropriately called an "area/fishery" closure, could be used to restrict one fishery in a given area in order to minimize or prevent adverse impact on another fishery in that area.

Possibilities range from opening the entire system for the taking of salmon through closing most of the productive areas to the taking of salmon. The most likely approach will involve designating a variety of special areas where one fishery or a specified combination of fisheries are available.

Season Closures

A closed season is used for a variety of purposes but for an Atlantic salmon fishery could specifically: protect a portion of the spawning run and emigrating smolts; allow for a "quality fishing experience" by limiting other fisheries; and allow for other fisheries by limiting salmon fishing. The management options are nearly unlimited, but fall into three categories: 1) predetermined statewide seasons for each fishery; 2) season/area combinations for each fishery involved; and 3) announced seasons for each relevant fishery.

Predetermined statewide seasons for each fishery would be a continuation of the existing method of setting seasons through the standard regulatory process. Seasons are set well in advance and cannot be changed without completion of the same administrative process used in establishing them.

Season/area combinations could involve opening and closing dates by species for each river, river section or specific pool. Statewide seasons might be established with special additional limitations for specific areas.

Announced seasons for each relevant fishery would involve the establishment of statewide seasons by regulation with the authority built in to change opening or closing dates for specific fisheries and/or specific areas.

Each option has its advantages and serious consideration must be devoted to determining the approach finally adopted.

Catch Limitations

The purpose of catch limits is to restrict the harvest to provide for spawning escapement or to spread the harvest so all participants have an equal opportunity to catch a fish. The initial approach to any limits in a Connecticut salmon fishery would necessarily be arbitrary and will evolve as the fishery evolves. The present one-fish daily limit will be retained until a more appropriate number can be determined. There are several approaches to limiting catches and to controlling and enumerating catches.

Gear Restrictions

Gear restrictions are generally imposed to limit the efficiency of the angler, thus limiting individual catches or total harvest. Although gear restriction options are relatively simple the impacts could be extremely complex on the Atlantic salmon fishery itself as well as on competing fisheries.

Public Participation

During the weeks and months ahead, the DEP Fisheries Bureau will be seeking all possible input from the public. A series of discussion meetings will be held before any formal proposals are prepared. In addition, any written comments will be more than welcome. Anyone interested in receiving a detailed discussion paper on Atlantic salmon management options or providing any comments or recommendations should contact the DEP Fisheries Bureau, Room 255, State Office Building, 165 Capitol Avenue, Hartford 06106. Telephone 566-2287. ■

Getting the bugs out

Biological monitoring helps to determine water quality

By Guy Hoffman, Environmental Analyst, Water Compliance Unit

Biological monitoring, in particular the sampling of benthic macroinvertebrates (aquatic insects, crustaceans, snails, leeches etc., that live on the botton of streams), has become a very useful and important tool in determining the water quality of rivers and streams in Connecticut. Biological sampling lets the sampler know exactly what is living in and on the river bottom and also allows estimates of how many organisms are living there. The health of the living bottom community is a function of the quality of water passing over the community during the previous several months. Even in an apparently clean stream, the effects of a spill or unauthorized discharge will be recorded in the bottom community.

Chemical data, though, has been and still is the mainstay for determining water quality in rivers and streams. The level of pollution or impact on a stream is typically determined by taking water samples and having them analyzed in a laboratory for concentrations of metals, nutrients and toxic substances. Taking biological samples along with chemical samples helps the biologist to better judge whether there is in fact an impact on the river and, if so, just how serious that impact is.

So if biological monitoring can be such an important tool in helping to assess the condition of rivers around the state, then exactly what is it, how is it done, what is found, and how is the data used?

Biological monitoring involves the collecting, preserving, identifying and counting of small macroinvertebrates. Most are aquatic, larval insects that most people know little, if anything about. But many of the adult forms of the same insects are recognized by many people and include such groups as mayflies, stoneflies, dragonflies, damselflies, caddisflies, blackflies and mosquitos. The larval insects are born in the water and will remain there anywhere from a few months to five years. Most of the insects have a life cycle of one to two years, however. Other organisms included under macroinvertebrates are crustaceans (shrimps, crayfish, scuds, mites), annelids (aquatic worms, leeches) and mollusks (snails, limpets, mussels).

To collect these macroinvertebrates, sampling equipment such as nets, waders or hip boots, forceps, vials, preservatives, gloves, and tags are needed. Sampling usually takes place in a fast flowing (riffle) area of the stream with a water depth of no greater than two feet. After the macroinvertebrates are collected and preserved, they are looked at under a dissecting microscope, where they are identified and counted.

The Water Compliance Unit currently samples 18 river sites around the state in both the spring and fall. The sites were established to monitor long-term pollution trends in these rivers. The stations range from sites on rivers with no discharges to sites below both organic and toxic discharges. Biological sampling has also been used to try to determine the impact of individual discharges on the receiving stream.

There are four types of samples collected by the Water Compliance Unit, using different sampling equipment. They are: Surber samples taken with a Surber sampler that has a one-square-foot sampling area and

attached net; multiplate samples collected by clay disk samplers that insects colonize when placed in the river; and biotic index and qualitative samples, both taken by means of a kick net.

Once all of the raw biological data is put together, several different parameters are looked at. These parameters are: 1) the number of organisms collected; 2) the number of taxa (different types of organisms); 3) diversity index; 4) biotic index (average of pollution tolerances for the insects collected).

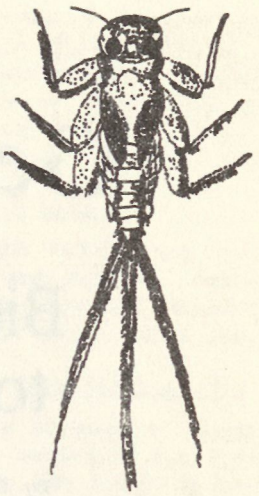
It is important to remember that to make an accurate assessment of a river, analysis of more than one parameter is necessary. Looking at only one parameter can often be misleading.

Most people are not aware of what types of organisms live on stream bottoms or what they look like. Following are a few of the more common macroinvertebrate taxa (of more than 300 taxa) collected in Connecticut. They are grouped together according to the water conditions in which they are typically found.

Organisms Typically Found in UnPolluted Water

Stenonema sp.
Ephemeroptera (Mayflies)

Mayflies are generally considered to be sensitive to organic and chemical pollution. They are common throughout cleaner rivers in Connecticut. While mayflies are found in a variety of habitats (lakes, large rivers, streams), Stenonema sp. are typically found in swift flowing streams. Its flat body shape is well adapted for clinging to the bottom substrate. Most of their lives are spent in the stream in a nymph

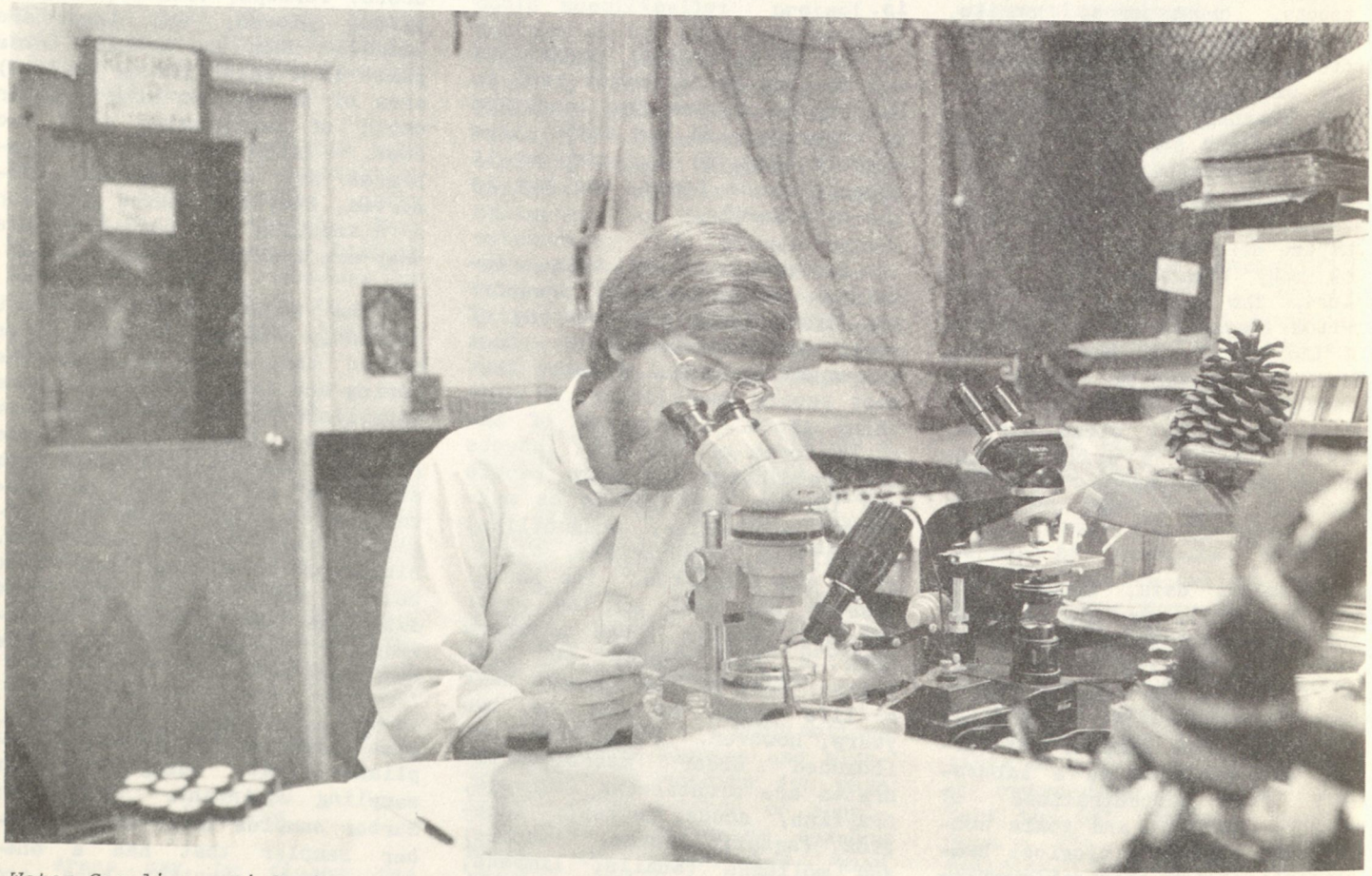


Stenonema sp.

stage while they go through several instars (shedding of their skin as they grow).

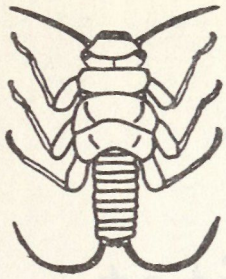
Acroneuria sp.
Plecoptera (Stoneflies)

This is a common stonefly which is found in cold, clean



Leslie Bieber

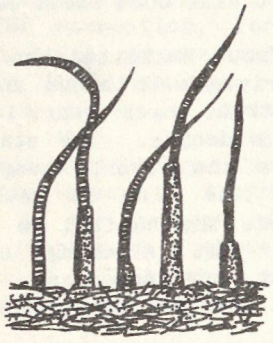
Water Compliance Biologist Guy Hoffman counts aquatic organisms in water sample.



Acroneuria sp.

rivers. It needs high dissolved oxygen (D.O.) concentrations to survive and is usually a good indicator of unpolluted water. The larvae are carnivorous, feeding upon other larval insects including mayflies, caddisflies and chironomids. They can be a major food source for fish. The life cycle for most species is greater than one year.

Organisms Typically Found in Polluted Water



Tubifex sp.

Tubifex sp.
Oligochaeta (Aquatic worms)
Limnodrilus sp.

These Tubificid worms are very common in waters with a high organic content. In Connecticut they are typically found in large masses downstream of sewage treatment plants. They are well adapted for burrowing in soft sediments and live within tubes that they build. Tubifex sp. can withstand very low dissolved oxygen levels and feed primarily on algae and bacteria.

Erpobdella punctata punctata
Hirudinea (Leeches)

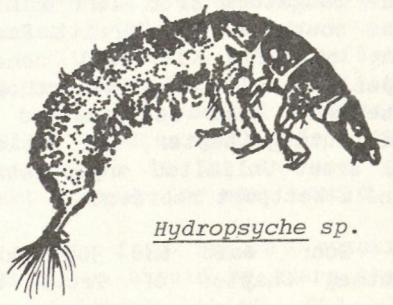
This is the most common leech found in our sampling of Connecticut streams. Though it is not necessarily an indicator of organic pollution, it is often found in large numbers in organically enriched bodies of water. Though often mislabelled as a "bloodsucker" it feeds upon Oligochaetes (such as Tubifex sp. and Limnodrilus sp.) and snails.

Erpobdella punctata punctata

Organisms that Can Be Present in Either Polluted or Unpolluted Water

Hydropsyche sp.
Trichoptera (Caddisflies)
Cheumatopsyche sp.
Symhitopsyche sp.

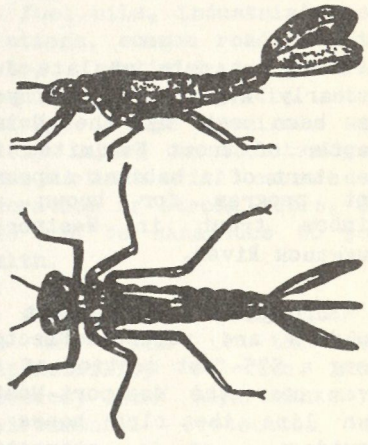
These three taxa of Hydropsychid caddisflies are probably the most common insect larvae in the rivers and streams of Connecticut. The larvae are filter feeders and spin silken nets that capture algae, fine organic matter and small macroinvertebrates. In general they are tolerant of organic pollution but not of chemical (toxic) pollution.



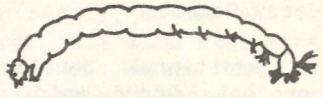
Hydropsyche sp.

Argia sp.
Odonata <Zygoptera>
(Damselflies)

This is one of the most commonly-found damselflies in Connecticut streams. It lives in lakes, ponds and streams among dense vegetation. It obtains oxygen by means of three external abdominal gills. Both the young (nymphs) and adults are carnivorous. The nymphs feed upon other aquatic insects along with annelids and mollusks. The nymph stage can last from a few weeks to five years, depending on the species.



Argia sp.



Chironomid Larvae

Chironomids
Diptera (Midges)

Chironomids are common in almost all water systems. They are very small and examination of the teeth and antennae (at 1000x) is needed for precise identification of species. Such precision is needed if chironomids are to be used to help determine water quality because pollution tolerances vary dramatically among species. Their size makes collection, identification and enumeration of them difficult and time consuming. ■

Local group improves trout habitat

By John Kazzi

A target date of late July or early August of this year has been set by the Nutmeg Chapter of Trout Unlimited for the start of a habitat improvement program for brown and rainbow trout in Westport's Saugatuck River.

Through the placement of boulders and water deflectors along a 575-foot section of the river near the Westport-Weston town line the club hopes to provide an attractive year-round environment for the fish the waterway now lacks at that location, according to Trout Unlimited Chapter spokesman Jerry Gourd.

An additional benefit of the project, Gourd said, will be the halting of bank erosion along the river, which annually claims three to four inches of soil and is threatening to undermine Ford Road, the Westport town road that provides public access to the river.

During the spring, the water depths of the Saugatuck where the work will be done range up to six feet as feeder streams and the Saugatuck Reservoir contribute to its rush to Long Island Sound. But by the middle of the summer, that water depth has dropped to five inches or less.

Construction of deflectors made from wooden telephone poles will divert the river into a narrower channel. Scouring action will create deep pools of cool water in which the fish thrive best, Gourd said.

The deflectors will be well camouflaged and new vegetation will be planted along the banks. Engineering studies done by the chapter have shown that the deflectors will not create hazardous flood conditions downriver when the Saugatuck is at its highest level in the spring. The barriers are only expected to protrude two feet from the river bottom.

The boulders placed in the river would cause turbulence and increase the dissolved oxygen content of the water.

The section of the river where the project will take place is designated for fly fishing only by the Bureau of Fisheries of the Department of Environmental Protection, which has applied that designation on the Saugatuck from Dorr's Mill Dam south to the Merritt Parkway bridge. It will remain open to all fishermen, though the work will be financed by the Nutmeg Chapter, the national Trout Unlimited organization and a Westport resident.

Gourd said the 300-member Nutmeg Chapter of Trout Unlimited has raised approximately $3,500. The national organization's Clear Water Restoration Fund has matched that amount. The remainder of the work will be financed by Leon Hirsch, whose property is located along the banks of the river at the site. Gourd estimated that the completed effort will cost about $20,000.

Trout Unlimited has stocked the river with brown and rainbow trout each year for more than a decade. The state also stocks the river, though Gourd added the club is seeking to enhance the habitat to the extent that stocking will no longer be necessary as the trout survive year-round.

The project will be started this summer when the river is at its lowest depth. The chapter received the approval of the Westport Conservation Commission in August 1983 and is currently awaiting the approval of the U.S. Army Corps of Engineers.

Gourd said chapter members will continue to clean the area and remove litter as they have done in the past. He said the chapter is also interested in a second project on the Saugatuck, the restoration of a fish ladder at a dam on Lee's Pond below the Merritt Parkway bridge. ■

The "blue" in you

By Jim Murphy, Principal Environmental Analyst, Water Compliance Unit

Astronomers tell us Earth is a unique planet because it is inhabited by living things. They also say it possesses one outstanding characteristic which sets it apart from all other planets: water. Earth, the water planet, is also Earth the living planet. Life cannot exist without water and we humans are 98 percent water.

Here in the Northeast, we are amply endowed with water. We receive precipitation on an average of every three days and have little trouble finding water for recreation, for use in industrial processes, for power or for drinking. There is such a bounty of this wet stuff that irrigating commercial agricultural land is seldom necessary. A graphic display of our wetness can be seen by looking at a state road map; blue features nearly dominate the land surface.

This article will be addressing some of those obvious blue features on our landscape and the not so obvious feature of ground water. Why do we need to spend time reading about something which is so abundant and accessible? Certainly, we all should be concerned with our drinking water for we are literally walking bags of water. To turn a common phrase, we may well be what we drink.

If you know where your drinking water comes from and who owns it, the next question to be answered is "how clean is it"? Before venturing into an explanation of drinking water quality, it is helpful to first understand what one might normally find in any Connecticut surface watercourse or ground water. Water quality is essentially a chemical, physical and biological characterization of water. Terms such as "dirty," "polluted" or "clean" really are several statements which can mean anything and nothing. What you consider clean water might be characterized by your neighbor as foul, tepid, gutter drainage. Depending on the source, whether it is treated or untreated and the presence of man-made chemicals, your drinking water will likely contain many natural elements.

Natural water quality is almost always suitable for direct human consumption. In some instances, it may have a foul odor, be colored or have an odd taste due to the presence of organic matter or elemental sulfur. These conditions can be corrected by simple water purification devices installed at the tap or along the water line. "Hard" and "soft" waters are other common characterizations and indicate dissolved mineral content. "Hard" water contains high concentrations of calcium and magnesium which cause scaling on pipes, stains in basins and poor detergent sudsing. This can be corrected by addition of a water softening device on your water line. It is worth noting however, medical studies implicate softened waters in the increase of heart disease for some people.

Aside from natural constituents, we should be aware that our drinking water can be tainted by chemicals we have introduced into the environment. There are many sources and types, such as lubricating and fuel oils, industrial waste solutions, common road de-icing salts, pesticides, landfill leachate and septic tank drainage. Some chemicals will merely impart an odd taste to water, others will cause dark coloration or strong odors, and some can be hazardous to your health.

Assuring that your water is fit to drink is the dual responsibility of two state agencies; the Departments of Environmental Protection and Health Services. The DEP regulates the discharge of waste waters from business and industry so that no discharges are allowed into our drinking water supply, either surface or ground. The DOHS regulates the quality of water used. All utility-owned water supplies must be periodically sampled for several chemicals and conditions. If certain standards of purity are not met, the water supply must be treated or abandoned. Each municipality has a Director of Health acting as their chief health agent who is usually assisted in enforcing the Connecticut Public Health Code and federal standards by local sanitarians.

All of these professionals have your health as their major concern. The water you drink must be maintained in a potable state; to determine whether it is or not the water must be rigorously tested. Testing water quality is a two-step

process which must be performed following standardized procedures. First a sample must be collected utilizing clean glassware and then sent to a state-approved testing laboratory. A routine test consists of an analysis for such physical characteristics as pH, color, turbidity and odor; for bacteriological quality; and for chemicals such as nitrogen compounds and chloride. It is important to remember that these basic tests may indicate a supply is potable, which may not be true if such unsampled chemicals as pesticides and organic chemicals are present. Also, a sample is only indicative of conditions present at the time of sampling; a supply which is potable today might easily become contaminated the day after a sample is drawn.

The responsibility for periodic sampling of water utility supplies, whether drawn from surface water reservoirs or wells, falls to the utility. Each utility is required by the Public Health Code to sample their supply at least monthly and certain standards of purity for the raw, untreated water and the finished, treated water must be maintained. If you are served by a water utility you can rest assured that water is well protected. The quality of water drawn from an on-site well at your home, however, is your responsibility. Each homeowner must assess his own individual supply and should do so when purchasing a new home. The cost for testing should be part of the negotiated selling price.

You can help assess the quality of your present drinking water in two basic ways. First, look at it. Is it discolored, cloudy or marked with floating or settleable solids? Smell it; do you detect odd or unfamiliar odors? Taste it; are there strong or sharp tastes? Is there an oily or gummy after-taste? If any of the above characteristics are present, then you probably should have your water tested. Your local director of health or the state Department of Health Services can identify private, state-approved water testing laboratories. Water testing of private home supplies is a responsibility of the home owner. It is wise to shop around to obtain the best price but again, only contract with state-approved facilities.

The second basic self assessment is to evaluate your surrounding land uses. Do you border on a commercial or industrial district? Many businesses and manufacturers use, store or dispose of varied solid and liquid products which could contaminate your water supply. A relatively common ground water contaminant is fuel oil or gasoline stored in underground steel tanks. Traditional waste disposal sites such as landfills, junkyards and the like have also proven to be potential ground water polluters. If any business or industry you suspect of employing chemicals on a daily basis is adjacent or uphill of your home and you are drinking water from an on-site well, then it may be advisable for you to contact the local health sanitarian or director of health for advice and assistance. You may also wish to inquire of these same individuals whether a commercial manufacturing establishment near your home is using chemicals and what, if any, waste products are being disposed of on-site.

If you decide to have your water tested, contact your local health officer for a listing of approved laboratories. You may only wish to confirm your supply is potable by having a simple chemical, physical, and bacteriological test performed. This type of test should cost less than $50.00. A more involved testing, for pesticides, organic chemicals like petroleum or for such inorganic chemicals as lead, will increase costs dramatically. The type of testing you need will be determined by your assessment of your water's taste, odor and color and the land uses surrounding your home. In the Department's view, you should seek the advice of your local health director and professional water testing firms to further assess your sampling needs.

If your on-site water supply has been contaminated, don't sell the farm and head for Canada. There is hope. Some types of contamination can be successfully treated by use of water purifying equipment. If the source of the problem has been accurately located, it may be possible to drill a new well on your property which would not be affected. You may be able to connect with a neighboring water system. If none of the above are possible, you can always drink and cook with bottled water and may still be able to bathe and flush with your tainted supply. Watering your garden may not be possible. If the problem has affected several homes in your area, the town may be required under a new state law to provide you with drinking water. This could consist of bottled water or an entire water main system.

When water is provided by a public water utility, legally defined as a system providing water year round to 25 or more people or a system as having more than two connections, the utility must provide a potable supply. They cannot supply drinking water that does not meet state and federal standards for purity. As an interim measure you may have to contend with bottled water but in the long run the utility should be attempting to either cleanse the existing source or develop a completely new one.

At this time, the legal framework for dealing with water supplies is relatively strong. Federal law is backed by more comprehensive and stringent state laws which are constantly being improved upon. You as individuals have the right to sue the guilty

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Aquaculture

Farming Connecticut's waters

By Diane Giampa, Public Participation Coordinator

When most people think of cultivating and harvesting for food, they imagine activities that take place on land. But farming can also take place in the state's waters and tidal wetlands, and the cultivation and harvest of aquatic animals and plants is an important undertaking in Connecticut.

Last year, the Connecticut General Assembly passed Public Act 83-36, which authorized the forming of a state Aquaculture Commission. Members of this group were charged with developing and implementing policies to promote aquaculture in the state's waters. In passing this act, the legislature recognized both the environmental and economic benefits that the citizens of Connecticut would gain from enhanced aquaculture activities.

In the early part of the century, over 1,000 people were employed by Connecticut's oyster industry, and 88,000 acres of shellfish farms were cultivated. Today, however, the industry operates at less than half its historic level while the demand for Connecticut seafood remains high: last year, over $12 million worth of fish and shellfish were landed in the state.

While Long Island Sound provides a unique habitat for aquatic plants and animals, there has been a decline in the number of species over the years as a result of over-harvesting, pollution and habitat loss. Aquaculture, by using techniques that are tailored to individual species, can dramatically increase both the quantity and the quality of our fish and shellfish. On the wholesale market, the Connecticut cultivated oyster presently sells for $55.00 a bushel; that's $20.00 more than the Chesapeake Bay oysters fetch in the same market.

Here's an example of how the process works. Each oyster spawning season (between July and October), large amounts of clean shell (called cultch) are planted on submerged lands. The cultch acts as a substrate upon which the naturally occurring oyster larvae settle, attach and grow. The oyster crop is then watched and cultivated through the four years necessary for the shellfish to reach market size. The seed oysters are transplanted several times to prevent overcrowding as they grow. The final transplant locates them in clean, certified waters so that the oysters will be cleansed to meet the strict health standards that govern the harvest and sale of the shellfish.

Expanding and managing aquaculture activities comes under several jurisdictions. The Department of Agriculture's Aquaculture Division leases and manages submerged land for the purpose of cultivating shellfish, and also maintains state shellfish spawning beds. The Department of Environmental Protection regulates all private finfish and crustacea culture and hatchery facilities in the state, and also operates two trout hatcheries and one salmon hatchery of its own. The Department of Health Services is responsible for designating growing areas as either open or closed to the taking of shellfish for direct consumption. It also licenses and regulates seed oyster harvesting and transplanting activities. Many of Connecticut's coastal towns have local shellfish commissions that also offer opportunities for aquaculture activities.

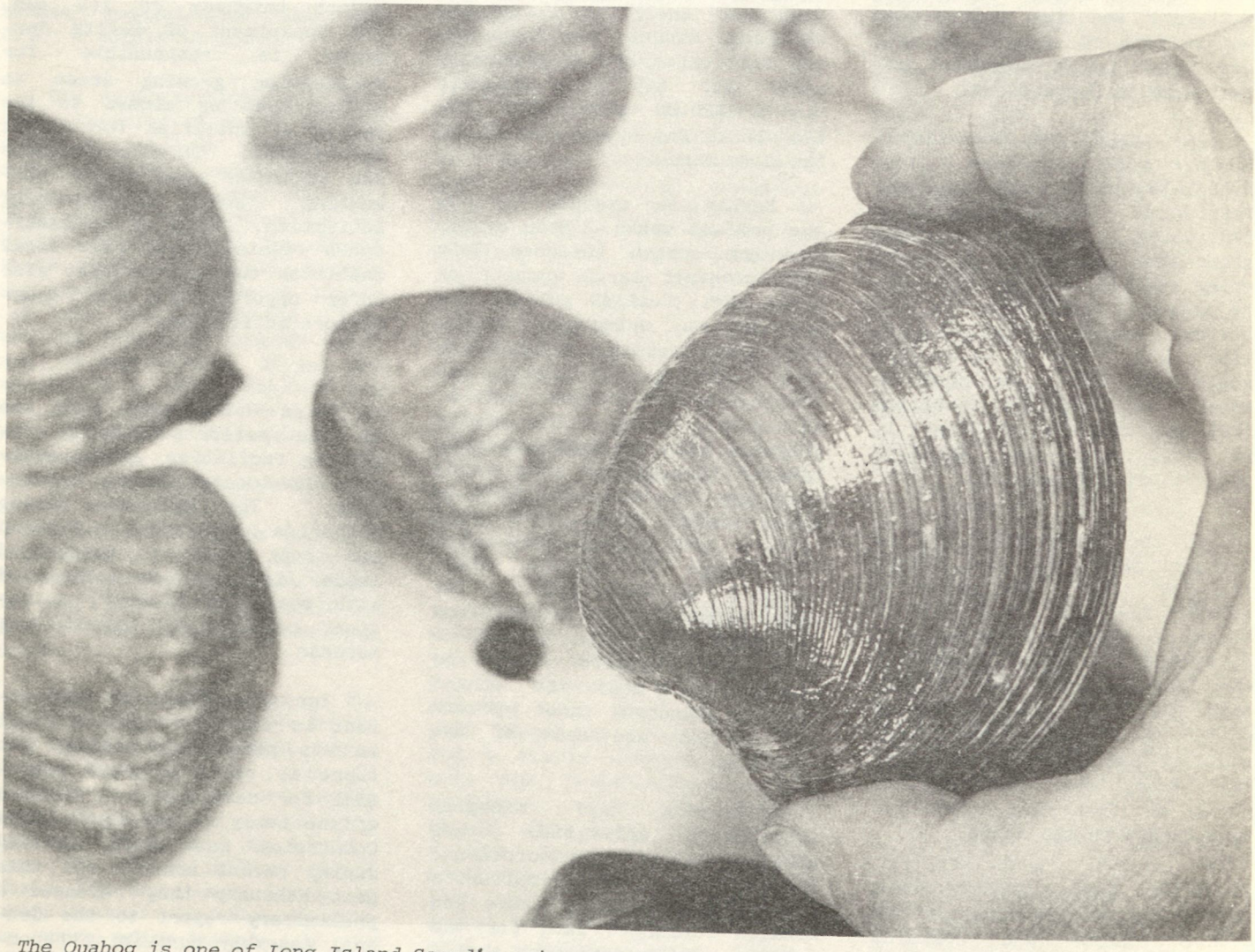
We are fortunate that one of the nation's leading research facilities in aquaculture is located on our shoreline. The National Marine Fisheries Laboratory in Milford has long been a recognized leader in research associated with shellfish biology, nutrition, genetics and aquaculture methods.

Yet aquaculture in Connecticut is in many respects still in its pioneering stages, and there is still a great potential for development. Members of the newly formed Aquaculture Commission have been meeting during recent months, and this past February they released a preliminary report to the General Assembly containing recommendations of ways that the industry might be improved.

Commission members have recommended that the Sea Grant and Marine Advisory Service programs be expanded and have suggested the importance of encouraging vocational training for high school students in aquaculture industry techniques. They also noted how the illegal harvesting of polluted shellfish beds is both a public health threat and a liability to the shellfish industry, and they have recommended hiring additonal enforcement personnel and increasing the penalties for illegal harvesting.

One of the Department of Agriculture's Aquaculture Division's priorities is to rehabilitate the state's public seed shellfish beds, and the Commission recommended that funding be made available to modernize and repair boats and equipment for this purpose. Funds would also be well spent, the Commission added, on an annual cultch planting program.

In the months ahead, the Aquaculture Commission will review the culture potential for various species of aquatic animals and plants suitable for food production, natural stock restoration, recreation, pharmaceuticals and energy production. In its final report, the Commission will also provide an overview of aquaculture developments occurring both nationally and abroad. The benefits of "farming the seas" have long been recognized by foreign nations (particularly Japan, Spain and France) as one answer to dwindling food supplies and finite natural fishery stocks. And it is more than figuratively "food for thought" that the United States imports nearly eighty percent of all the seafood it consumes. The establishment of a state Aquaculture Commission seems to be a timely effort that can provide important benefits for the citizens of Connecticut. ■



Dept. of Agriculture, Aquaculture Division

The Quahog is one of Long Island Sound's prime candidates for aquaculture. Larger than its relatives, the littleneck and the cherrystone, it can grow up to fifty years old and six inches in diameter. The Indians named them Quahog which means "dark, hard shell."

By Leslie Bieber,
Citizens' Participation Coordinator

For Your Information

EPA sets priorities

The U.S. EPA has developed a list of the most important objectives it hopes to accomplish in FY 1985.

The list contains 31 priority activities. It is not intended to include everything that the Agency must do to fulfill various statutory or judicial requirements -- in fact, a number of these non-discretionary activities are not included on the list.

In developing the list, priority was given to those items that will result in significant incremental improvements for the environment and public health if they receive emphasis now. The list gives less stress to mainline programs that may deserve a higher absolute priority but which have become well-established and will continue to produce results without special attention.

The following are the Agency's priorities for FY 1985:

1. Stabilize imminent threats at uncontrolled hazardous waste sites through Superfund removal actions.

2. Use the Superfund remedial Program to complete longer-term complex site cleanups through fund-financed actions.

3. Take enforcement actions to reduce the number of RCRA Class I violations by major hazardous waste handlers and enforce compliance with issued permits, paying special attention to ground water monitoring, closure, and post closure requirements.

4. Issue Part B Resource Conservation and Recovery Act permits, giving greatest priority to those facilities where there are the greatest potential environmental risks.

5. Implement an acid deposition strategy.

6. Implement the ground water strategy in coordination with EPA programs with ground water responsibilities. Assist State ground water programs, improve the ground water data base, and work closely with other federal agencies.

7. Reissue National Pollutant Discharge Elimination System permits expeditiously, either directly or through EPA/State agreements. Apply the new treatment requirements contained in the revised effluent guidelines and, where necessary, water-quality-based limits beyond Best Available Technology. In conjunction with this, develop and implement water toxics monitoring and control strategies addressing toxics in both surface water and sediment.

8. Negotiate responsible party cleanup at Superfund enforcement-lead sites and pursue cost recovery actions for sites cleaned up with federal funds.

9. Under the Toxic Substances Control Act existing chemicals program, initiate and promulgate regulatory actions of the most significant risks. In particular, address hazards from asbestos by strengthening the asbestos in schools program and promulgating and enforcing other regulations to address commercial manufacture, use of asbestos products, and exposure to asbestos in public buildings or ambient air (under Clean Air Act) as necessary.

10. Promulgate Phase I (Volatile Organic Compounds) of the drinking water standards. Expand the program of issuing health advisories for unregulated contaminants in support of Superfund cleanup activities, state agencies' responses to contamination incidents, and other purposes.

11. Conduct special reviews of pesticides suspected of causing adverse health and environmental effects and initiate cancellation and suspension actions as appropriate.

12. Protect the wetlands through vigorous attention to Sec. 404 reviews.

13. Develop and implement air toxics monitoring and control strategies. Specifically, develop new National Emission Standards for

Hazardous Air Pollutants and provide states with technical support in areas such as ambient monitoring, stack tests, and specific chemical risk assessment.

14. Implement the dioxin strategy developed in FY 1984.

15. Promulgate RCRA regulations and take other actions to strengthen the existing RCRA program and anticipate RCRA reauthorization requirements. In particular, address alternatives to land disposal for hazardous wastes, high-priority waste handlers, and materials not covered under existing regulations.

16. Implement the municipal strategy to assure the construction and effective operation of municipal facilities.

17. Manage the construction grants program to ensure that resources are directed to projects with the greatest water quality benefit.

18. Complete the review and revision of National Ambient Air Quality Standards as necessary and support development of corresponding state control plans. Monitor implementation of revised State Implementation Plan schedules for attainment of primary lead, particulate matter, ozone, sulfur dioxide, NOx, and CO NAAQS in nonattainment areas.

19. Work with states to incorporate nonpoint source control measures in their water quality programs, where nonpoint source pollution is a major problem, and assure provision of technical assistance from the Department of Agriculture.

20. Ensure the Federal Government shows leadership in environmental control practices through federal facility compliance with air, water, toxics, and hazardous waste requirements.

21. Increase development of high priority New Source Performance Standards, proposing and promulgating more standards than in FY 84.

22. Implement the pretreatment program to control pollution from indirect discharges by approving state and local pretreatment programs, focusing first on those with discharges of greatest environmental concern.

23. Work with states to develop and achieve high quality programs under interim and final RCRA authorization. Make every effort to assist states in meeting the statutory deadline for final RCRA authorization.

24. Subject new chemicals under TSCA to a meaningful review using the Pre-Manufacturing Notification process to ensure that health and environmental risks are adequately characterized and necessary control measures are required.

25. Increase continuous compliance by facilities with air standards, especially with standards for VOCs and other gaseous pollutants not amenable to simple opacity tests.

26. Achieve compliance with PCB rules and regulations focusing inspections and enforcement actions on the greatest potential sources of harmful PCB exposure.

27. Implement an underground injection control program in direct implementation states focusing permit issuance on those existing facilities that present the greatest threat to underground sources of drinking water and on those new facilities which must be permitted to prevent an unnecessary adverse impact on oil and gas production. Implement the ban on underground injection of hazardous waste into or above an aquifer.

28. Prepare program and technical regulations to implement a program for management, disposal, and reuse of municipal sewage sludges.

29. Ensure in-use vehicle compliance through assisting states with their anti-tampering and lead fuel switching programs and by conducting audits of inspection and maintenance programs.

30. Promulgate Phase II (Revised Regulations) of the drinking water standards and ensure compliance by public water systems with applicable standards.

31. Thoroughly review the projected environmental impacts of proposed federal projects and regulations under section 309. ■

Waste conference scheduled

The League of Women Voters of Connecticut will present a one-day seminar devoted to the issue of waste management on Saturday, April 21, at Trinity College in Hartford. Topics will include managing our solid, hazardous, and nuclear wastes.

Questions will be raised as to how can citizens and state and local officials adequately protect our health, economy, and environment at the same time. Various options for solving the waste management problem will be discussed.

This conference should be of great interest to anyone concerned with the potentially harmful by-products of our modern society. For more information contact the League of Women Voters at 288-7996. ■

Earth Fair '84

If you enjoy the beauty, variety, and utility of the earth's bountiful resources, there's something for you at the EARTH FAIR '84. In fact, we venture to say there's something for everybody!

Fascinated by snakes? The Connecticut Herpetological Society will have a live exhibit.

Want to take the kids on a nature walk, but don't know much about what's out there? Nature walks are scheduled especially for you (with them).

Can't wait to start your garden this year? Representatives from the Tolland Garden Center and the Ladd Nursery of South Windham will be there with helpful hints.

Are you confounded by the ecology of the hundreds of ducks and geese at Mirror Pond? Dr. Robert McDowell will lead a walk to view this controversial highlight of the campus scene, and will discuss with participants the ecological and sociological problems it represents.

Interested in the beautiful specimens of trees on UConn's campus? Dr. E.C. Carpenter and Dr. Ed Corbett are leading Tree Identification Tours at three times during the day.

Want to know more about birds and birders, about wetland plants, about whales or stars or renewable energy? There's an expert, a tour, or a display to help you learn!

The horticultural and life sciences greenhouses, the animal barns, and the apple storage plant are all scheduled to show off their specialties. (There's even a Taste Test of different apple varieties planned for the last.)

If you bring your own, you may "go fly your kite" on Horsebarn Hill, where enthusiasts will help you if yours is one which seems addicted to nose-dives.

Insects, landscaping, soil testing, endangered plants, injured wildlife, stars, glaciers, and backpacking equipment -- there's something scheduled about each of these. The list goes on and on!

This big event, scheduled for 11 AM to 5 PM, April 29th at UConn's Ratcliffe Hicks Arena on Route 195 in Storrs, is a cooperative venture of the Sierra Club, the Museum of Natural History at the University of Connecticut, and the College of Agriculture and Natural Resources. Cooperating with them to make it a very special occasion will be a great number of experts from other organizations around the state. Admission is free.

If you have any questions, you many call Marion Atwood (Museum of Natural History) at 486-4460. ■

Leonard Lee Rue III has new offerings

Those of you who are regular readers of the Citizens' Bulletin are probably familiar with the work of wildlilfe photographer Leonard Lee Rue III. Rue is one of the most respected men in his field, and his photos have appeared in many major publications. Now, for the first time, Rue is presenting a seminar on "How I Photograph Wildlife and Nature."

The seminar will be held on Saturday, April 21 from 9:00 to 5:00 at the North Warren Regional High School in Blairstown, New Jersey. Registration fee is $30. Topics will include choosing and caring for equipment, how to photograph subjects such as birds and reptiles, and what the life of a nature photographer is really like.

Pre-registration for this seminar is a must as tickets will not be available at the door. For more information contact Leonard Lee Rue III, RD 3, Box 31, Blairstown, NJ 07825, (201) 362-6616.

Rue is also an author as well as a photographer. His latest book, and his first for youngsters, is titled Meet the Opossum. As you might expect, the book is lavishly illustrated with Rue's photos; many of these depict aspects of the opossum's life that have never been shown before. We "bench tested" Meet the Opossum on a visiting second grader recently, and she was enthralled by both the photos and text. If you know a child who is interested in wildlife, this might be a wonderful gift.

Meet the Opossum is published by Dodd, Mead, and Co., New York, New York, and it should be available through your local bookstores. You can also obtain an autographed copy by sending $7.95 plus $1.50 for postage and handling to Leonard Lee Rue III at the above address. ■

Lifeguard positions available

William F. Miller, DEP Director of Parks and Recreation, has announced that more than 160 lifeguard positions will be available at state park beaches during the coming summer.

"Although some of these positions will be filled by returning lifeguards," Miller said, "most will be filled through a series of qualifying examinations starting Saturday, March 10 at 10:00 a.m. at the Kaiser Gym, Central Connecticut State College. Additional ses-

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Data Base

From page 2

uniqueness, purported medical and economic uses, and the considerable monetary returns when illegally traded unfortunately encourage their collection. Our response will reflect this concern for the survival and protection of the species. For this reason, the Data Base requires users to keep the information provided confidential. This means the information can only be used as stated in the original request.

Anyone with site-specific requests or information on rare and endangered species or critical habitats is encouraged to contact the Connecticut Natural Diversity Data Base in the State Office Building, Room 553, 165 Capitol Avenue, Hartford, CT, 566-3540. ■

Fresh fish

From page 3

meat and is still popular for the distinctive flavor which it produces. Larger fish such as five- to eight-pound carp, catfish, trout, shad, salmon, and bluefish are popular for smoking.

Prepare the fish by removing the scales (if any), the head and internal organs. Leave the skin on. Wipe out the body cavity and split the fish in half along the backbone. Soak the fish in a brine solution for 18 to 24 hours. Then rinse well in clean water, wipe dry and smoke.

The brine solution is made up by adding salt to cold water until it will float a medium-sized chicken egg. Only the tip of the egg will float above the surface. Some experts add brown sugar, black pepper and bay leaves to the brine in these proportions: for each cup of salt used in making the brine, add 1/2 cup sugar, two tablespoons pepper and two tablespoons crushed bay leaves.

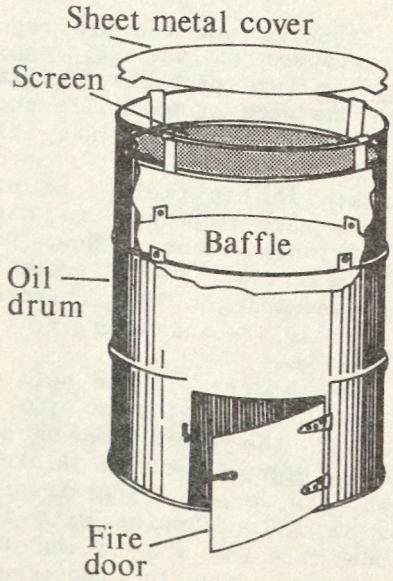
Make the fire with oak, ash, hickory, maple or fruit woods such as apple or cherry. Green wood from these trees can then be added to create smoke. If your supply of these woods is low, build a charcoal fire then add the wood. If the wood is dry it can be made to smoke by reducing the air supply to the fire. Do not use resinous woods such as pine, fir and hemlock.

Smoke the fish until the surface of the flesh becomes dry and golden brown. This will usually require eight to 10 hours when the smokehouse temperature is 160 to 180 degrees. Thin pieces will finish sooner.

Other times and temperatures can also be used for smoking. The quickest is a combination of two and one-half hours at 210 degrees with little or no smoke and finish for one hour at 85 to 100 degrees with smoke. The slowest is up to six days at 90 degrees.

How to Build A Smoker

Obtain a 50 gallon metal drum (oil or alcohol). Using a sharp cold chisel, the top of the drum is carefully cut out. Next reduce the diameter of the removed top about three inches. This top is then suspended from three brackets 13 inches from the top of the drum (see diagram). Next cut out a 10" x 7" section at the bottom side of the drum for the fire pit door. Lightweight sheet metal may be used for a door on a single hinge. A tray for holding the fish can be made from heavy 1/2" or 1/4" wire mesh. This tray is suspended six inches from the top of drum. A wood or metal cover may be used to hold smoke in drum. (Courtesy of Ohio Department of Natural Resources, Division of Wildlife). ■



Canada goose

From page 5

extended to one or two minute intervals. The lights should be moved every two or three days.

Balloons -- Most waterfowl are wary of an object that not only moves but is elevated higher than they. Helium filled balloons staked in open fields or over water are very effective if frequently moved and maintained. The balloons should be inflated to a diameter of about two feet. They should be suspended from 50 to 75 feet above the ground using 50-pound test or stronger monofilament line.

Automatic Exploders -- If geese are found in the same areas day after day automatic exploders can successfully repel them. The exploders are usually powered by propane, LP gas, or acetylene and make a noise louder than a shotgun blast. The blast timing, intensity, and period can be adjusted. Locations of exploders should be changed every two or three days. Use of exploders should be limited to areas where the noise will not bother anyone.

Bird control shells -- The use of a 12-gauge shotgun loaded with special bird control shotgun shells may be used to protect certain areas from geese. By moving from field to field with the geese and firing these "cracker shells" the geese can be scared off.

Conclusion

While wild migrating geese are certainly an asset to Connecticut's environment, the increasing numbers of resident geese are becoming more and more of a liability. Beyond protecting their personal property from nuisance geese, Connecticut citizens can help remedy this problem by not feeding geese and discouraging others from doing so. Wild waterfowl are better off left alone.

Sources of Equipment:

Lights
The Huge Co.
7625 Page Blvd.
St. Louis, MO 63133

Balloons
Tillotson Rubber Co.
1187 Highland Ave.
Needham, MA 02192

Bird Control Shells
Marshall Hyde Inc.
Port Huron, MI 48060

Automatic Exploders
Alexander-Tagg Industries, Inc.
395 Jacksonville Rd.
Warminster, PA 18974

Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38701

Further Information:

U.S. Fish and Wildlife Service
4 Whalley St.
Hadley, MA 01035 ■

Correction

The scientific name of the mute swan in the March issue of the Citizens' Bulletin should have read Cygnus olor. We apologize for this mistake. ■

"Blue" in you

From page 16

party and to appeal to the State Departments of Environmental Protection and Health Services and to the courts for redress. A contaminated water supply should not be looked upon as a complete dead end. There are solutions, though your patience and participation will be necessary.

A complete understanding of such a simple fact of our daily lives as drinking water would require the skills of a plumber, well driller, lawyer, sanitary engineer, geologist, hydrogeologist, natural resources manager and public health professional. It is obvious few people can hope to master all these technical areas so it is well for all of us to know who to call upon for advice and assistance. The following list is not exhaustive in its coverage, but it does identify those offices where certain key information about your water supply can be obtained:

GEOLOGY, HYDROGEOLOGY, WATER UTILITIES & THEIR SERVICE AREAS
Natural Resources Center
CT DEP
State Office Building
Hartford, CT 06106
566-3540

WATER POLLUTION CONTROL
Water Compliance Unit
CT DEP
State Office Building
Hartford, CT 06106
566-2588

WATER QUALITY, WATER TESTING
Water Supply Section
CT Dept. Health Services
Washington Street
Hartford, CT 06106
566-1253

Your local Sanitarian or Director of Health

Agencies with jurisdiction over water supplies and quality.

Summary

The "blue in you" is perhaps one of the most important health aspects in your life. Understanding where your water comes from, what its quality is, how and when to test it and what your supply alternatives are will have a lot to do with your quality of life.

We encourage you to obtain more information on your water supply system from the listed offices and to support state and municipal motions to protect your water quality. ■

Lifeguard

From page 21

sions are scheduled at the same location and hour on April 7 and April 21."

"Lifeguards must be 18 years of age or high school graduates by the time of employment," Miller said, "and must pass a practical competitive examination in lifesaving techniques. Lifesaving certificates are not required nor accepted as proof of ability."

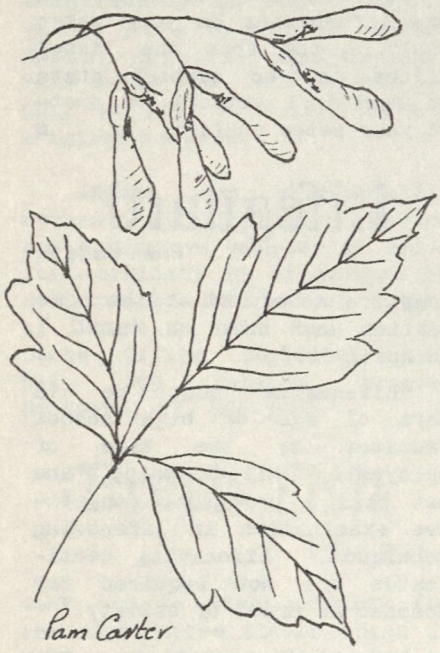
Lifeguard positions are available at Black Rock in Thomaston, Burr Pond in Torrington, Chatfield Hollow in Killingworth, Day Pond in Colchester, Gay City in Hebron, Hammonasset Beach in Madison, Hopeville Pond in Griswold, Indian Well in Shelton, Kettletown in Southbury, Lake Waramaug in New Preston, Mashamoquet Brook in Pomfret, Rocky Neck in Niantic, Sherwood Island in Westport, Squantz Pond in New Fairfield, Stratton Brook in Simsbury, Wadsworth Falls in Rockfall and Wharton Brook in Wallingford. Specific work assignments are made after the final qualifying exam.

Anyone interested in further information on lifeguard positions or in registering for the examinations should contact the Office of State Parks and Recreation, Department of Environmental Protection, Room 265, State Office Building, Hartford, Connecticut 06106, telephone 566-2304. ■

Trailside Botanizing

By G. Winston Carter

The Box Elder (Acer negundo)



It will probably come as a surprise that this tree is a maple because of its unmaple-like leaves. However, it does have the characteristic winged seeds of maples. In this species each wing of the seed is curved inward like ice tongs.

Box Elder is also called Ash-leaf Maple and Manitoba Maple. It is probably called Box Elder because its wood resembles the common boxtree (Buxus sempervirens) and the leaves are similar to those of Elderberry (Sambucus).

This species of maple prefers moist sites but is very adaptable and will grow even in poor soil. It grows best along rivers and streams but has become naturalized and is often found in waste places and along roadsides. It is a fast growing, short-lived tree which grows to medium size, reaching a height of up to 75 feet and a diameter of up to four feet.

The flowers of Box Elder appear from late March to mid-May before or with the leaves. The male and female flowers are always on separate trees. They are small and yellowish-green with each flower on a thin stalk. There are usually four to six stamens and the female flower has a single pistil. The leaves are compound and when only three leaflets are present they resemble poison ivy. However, poison ivy has alternate branching as opposed to opposite branching in the Box Elder. The compound leaves of the Box Elder may also have five leaflets, or sometimes more. The winter twigs are also worthy of attention. They may appear in several colors, often red, bright green or purple, with a white bloom which easily rubs off revealing a shiny surface underneath.

The wood of Box Elder is of limited value, being used for making crates, boxes, paper pulp and fuel. The seeds are the preferred food of evening grosbeaks and purple finches. The yellow warbler uses this tree for cover and nesting. The seeds are also eaten by squirrels and mice. White-tailed deer browse the young twigs and leaves. ■

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